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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,674	05/26/2005	Tom Hartley	UA.439	1930

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EXAMINER	
DIAO, M BAYE	
ART UNIT	PAPER NUMBER
2838	

MAIL DATE	DELIVERY MODE
08/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,674	Applicant(s) HARTLEY ET AL.	
	Examiner M'baye Diao	Art Unit 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4 and 7-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-4, & 7-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Amendment

1. Acknowledgement is made of Amendment filed on June 4, 2007.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 & 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al., (Yoon) US PAT 6,160,382 in view of Yamamoto et al., (Yamamoto) US PAT 4,360,762.

5. As per claims 1 & 3, Yoon discloses (col. 1, lines 7-14, 66-67; col. 2, lines 1-6,57-67) and shows in Fig. 4, a method and apparatus for determining characteristics parameters of a storage charge storage device including:

a non-linear equivalent circuit model for the charge storage device (20), thus meeting the limitation of developing an essentialized cell model structure of the electrical device;

the method includes measuring voltage and current characteristics by applying a voltage/current having a predetermined discharge rate to the capacitor (20), thus meeting the limitation of determining models parameters for charge-discharge data of said structure. Yoon also discloses (col. 8, lines 36-48) a voltage/current characteristics measuring means (15) to measure the current and voltage of the charge storage device (20).

Yoon differs from the claimed invention because he does not specifically disclose the determining charge-discharge behavior in a voltage-charge plane. Although Yoon discloses the capacitor (20) (see Yoon reference col. 7, lines 43-49) to be a non-linear device, he did not disclose the characteristics on a voltage charge plane.

Yamamoto discloses (abstract) a non-linear capacitor (3) (applicant's storage device) and shows in Fig. 2A the saturation characteristics of the non-linear capacitor on voltage-charge plane. Yoon further discloses (col. 1, lines 38-57; col. 2, lines 43-67) that the method includes analyzing the operational characteristics by examining and analyzing the internal parameters related to the mechanism of the storage device as well as average discharge voltage, discharge voltage profile, internal resistance, temperature characteristic and charge cut-off voltage (applicant instantaneous damaged rate), and thus meeting the limitation of, " the method according to claim 1, further comprising the steps of:

developing a charging profile based upon the instantaneous damage rate, wherein said the charging profile optimizes a charging current with respect to. the damage per cycle so as to extend the overall life of the electrical storage device ".

Yamamoto is evidence that ordinary skill in the art would find a reason, suggestion or motivation to use the characteristics of the non-linearity of the capacitor, charge storing device, such as to understand the saturation and the charging and discharging of the electrical storage device.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yoon by using the characteristics curve of the non-linearity of the capacitor for advantages such as, understanding the saturation and the charging and discharging of the electrical storage device as per the teachings of Yamamoto.

Accordingly, claims 1 & 3 would have been obvious.

FIG. 4

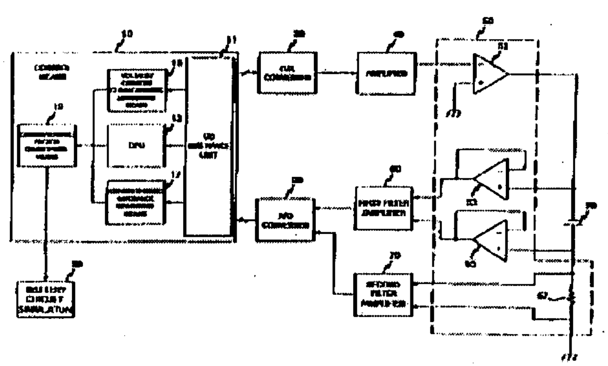
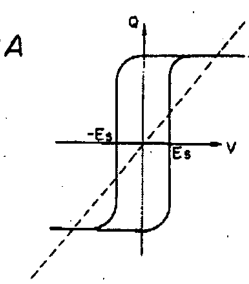


Fig. 2A



6. Claims 4 & 7 - 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al., (Yoon) US PAT 6,160,382 in view of Garstein et al., (Garstein) US PAT 6,118,248.

7. As per claim 4, Yoon discloses (col. 2, lines 43 - 56; col. 7, lines 11-67; col. 8; lines 1-56) and shows in Fig. 4 above, a method and apparatus for characterizing internal parameters of a charge storage device based on a wide frequency range of impedance measurements and a non-linear equivalent circuit model of the charge storage device comprising:

a control means (10) (applicant's simulation processor) receiving an input signal thru the A/D converter (80) sent to the electrical storage device (20) via the D/A converter (30).

Yoon also discloses that the control means (10) can use a separate voltage/current generator ((53) and (55)) (see col. 7, lines 45 - 49)to charge the storage device (20) directly, so that the voltage/current generator outputs predetermined voltage and current, charging the charge storage device under the control of the control means (10), thus meeting the limitations of modeling a plurality of states of the electrical storage device and generates an estimated output signal so that the controller mitigates damage of the electrical storage device.

Yoon differs from the claimed invention because he does not specifically disclose that the CPU (13) (applicant' processor) being comprised of a feedback component.

Gartstein discloses (col. 33, lines 41-67) and shows in Figs. 4B, 4C, and Fig. 7, a battery (110,730) (applicant electrical storage device) utilizing an embedded controller

circuit (140) (applicant simulation processor) method and apparatus for determining characteristics parameters of a storage charge storage device comprising a charge sub-controller which may optimize the charge of each cell based on actual feedback from that particular cell in order to maximize the number and efficiency. He also discloses (col. 25, lines 59-67) that the pulse-width modulation whose output voltage (applicant's measured output voltage) is continuously sampled and compared to a reference voltage and that the error correction signal is used to alter the duty cycle of the DC/DC converter. He further discloses that the negative feedback loop from the output voltage at the terminals of the electrochemical cell (730) (applicant's storage device) allows the converter (750) to provide a stabilized output voltage and furthermore he discloses (col. 23, lines 50-56) that the battery of the present invention also include a low remaining charge warning to the user.

Yoon also differs from the claimed invention because he does not specifically disclose the control means (10) comprising of a feedback component, which generates a correction signal wherein, said correction signal represents a real time estimate.

Gartstein discloses (col. 13, lines 14-18; col. 14, lines 4-11;col. 26, lines 1-8) that the embedded controller (140) comprising of the discharge sub-controller circuit (102), and/or the charge sub-controller circuit (104) based upon continuously or intermittently sensed operating parameters and/or physical conditions, an emergency disconnect sub-controller circuit (106) whose function is to preferably disconnect the electrochemical cell(s) from the battery terminals when the sensing circuit detects an unsafe condition, and a sensing circuit (105) which may measure operating parameters of the

electrochemical cell (130) such as the cell voltage, current drawn from the cell, current etc. He further discloses (col. 14, lines 33-37) that the charge sub-controller (105) minimizes losses by utilizing the instantaneous charge value of the cell(s) and the maximum capacity of the cell to continuously optimize the charging conditions, thus meeting the limitation of said correction signal represents a real time estimate of the amount of damage being done to the electrical storage device during re-charging.

Gartstein further discloses (col. 13, lines 14-28; col. 14, lines 4-11;col. 26, lines 1-8) that the embedded controller (140) comprising of the discharge sub-controller circuit (102), and/or the charge sub-controller circuit (104) based upon continuously or intermittently sensed operating parameters and/or physical conditions (applicant's plurality of modeled dynamic states) of the electric storage device.

Gartstein is evidence that ordinary skill in the art would find a reason, suggestion or motivation to use the negative feedback loop from the output voltage at the terminals of the electrochemical cell in order to allow the converter to provide a stabilized output voltage and to use the negative feedback loop of the charge sub-controller (105) in order to minimize losses by utilizing the instantaneous charge value of the cell(s) and the maximum capacity of the cell to continuously optimize the charging conditions.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yoon by using the negative feedback loop from the output voltage at the terminals of the electrochemical cell in order to allow the converter to provide a stabilized output voltage and to minimize losses by utilizing the

instantaneous charge value of the cell(s) and the maximum capacity of the cell to continuously optimize the charging conditions, as per the teachings of Gartstein. Accordingly claim 4 would have been obvious.

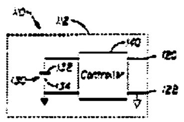


Fig. 4B

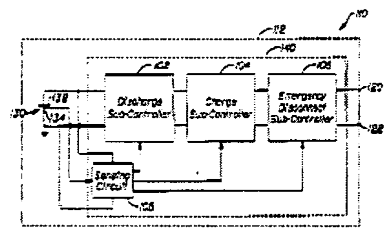


Fig. 4C

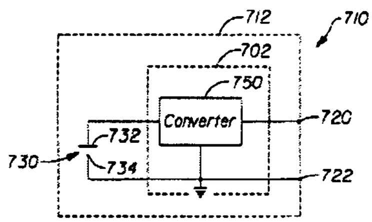


Fig. 7

8. As per claims 7, 9, 10 -13, Yoon differs from the claimed invention because he does not specifically discloses that the control means (10) (applicant's controller) receiving a correction signal representing a damage being done to the electrical storage device.

Gartstein discloses (col. 13, lines 57-64) that the charge sub-controller (part of the controller circuit 140) (applicant's controller) safely and efficiently controls the charging of the electrochemical cell(s) (130) (applicant' s storage device). He further discloses (col. 13, lines 44-47) that either the discharge sub-controller circuit (102), the charge sub-controller (104), or both may perform the function of the emergency disconnect sub-controller (106) as well. He further discloses (col. 13, lines 11-28; col. 14, lines 4-36) that the sensing circuit (105) also measures physical conditions of the electrochemical cell such as temperature, pressure, the hydrogen and/or oxygen concentration, etc, and minimizes losses by utilizing the instantaneous charge value of

the cell(s) and the maximum capacity of the cell to continuously optimize the charging conditions.

Gartstein is evidence that ordinary skill in the art would find a reason, suggestion or motivation to use the negative feedback loop of the embedded controller (140), which comprises of the charge sub-controller and sensing circuit (105), the discharge sub-controller (102), and the emergency disconnect sub-controller circuit (106) to optimize the charging conditions.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yoon by using the embedded controller (140) in order to optimize the charging conditions of the electric storage device as per the teachings of Gartstein.

Accordingly claims 7,9,10-13 would have been obvious.

9. As per claim 8, Yoon differs from the claimed invention because he does not specifically discloses the control means (10) comprising of a feedback loop receiving a feedback signal representing the damage being done. He does not specifically disclose that the voltage-current characterization means (15) generates an output signal such that a charging current is applied more during a first half of a charging period than in a second half.

Gartstein discloses (col. 17, lines 1-8) that the battery (10) is designed to extend its service by maintaining the output voltage of the battery at a level greater than or equal to the cut-off voltage of a given device until the sub-controller shuts down when the voltage of the primary electrochemical cells drops below a threshold level, or when a

rechargeable electrochemical cell can no longer operate, or when a rechargeable electrochemical cell drops to its optimal discharge depth. He further discloses (col. 25, lines 50-67) that the duty cycle of the DC/DC converter controlled by a pulse-width modulation (PWM) is zero when the converter is off, and 100% when the converter is operating at full. He further discloses (col. 26, lines 19-27) that the DC/DC converter may be turned on only when the cell voltage falls to a predetermined level below which the load can no longer operate (during charge), thus meeting the limitation of a charging current is applied more during a first half than in a second half.

Gartstein is evidence that ordinary skill in the art would find a reason, suggestion or motivation to use the pulse-width modulation of the DC/DC controller such as for control schemes and optimization to control the optimizing parameters of the converter.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yoon by using the PWM of the converter to control the optimizing parameters of the converter as per the teachings of Gartstein

Accordingly claim 8 would have been obvious.

Response to Arguments

10. Applicant's arguments filed 06/04/2007 have been fully considered but they are not persuasive.

11. In reference to claim 4, Applicant argues that Yoon et al. fail to disclose, teach or suggest an optimal recharging controller for an electrical storage device that comprises, among other components, an observer component which receives a correction signal and an input signal so as to generate an estimated output signal and an estimated

internal state signal, wherein the correction signal represents a real-time estimate of the amount of damage being done to the electrical storage device during recharging.

12. Examiner respectfully disagrees and submits that Yoon discloses (col. 2, lines 43-56; col. 7, lines 11-67; col. 8, lines 1-56) and shows in Figs. 4, 7 & 8, a method and apparatus for characterizing internal parameters of a charge storage device (20) based on a wide frequency range of impedance measurements and a non-linear equivalent circuit model (see Figs. 3 & 7-8) of the charge storage device (20) comprising:

a control means (10) (applicant's simulation processor) receiving an input signal thru the A/D converter (80) sent to the electrical storage device (20) via the D/A converter (30),

a separate voltage/current generator (buffers (53) and (55)) (see col. 7, lines 45-49) to charge the storage device (20) directly, so that the voltage/current generator ((53) and (55)) outputs predetermined voltage and current, charging the charge storage device (20) under the control of the control means (10). Yoon further discloses (col. 7, lines 27-30) a parameterization circuit (19) for obtaining the parameters of the non linear equivalent circuit model of the charge storage device (20). Therefore the charge storage device (20) powers a motor which has a non linear circuit model as shown in Fig. 8.

13. In reference to claims 1 and 3, Applicant also argues that Yamamoto et al. are only concerned with a starter switch for a fluorescent lamp.

Examiner respectfully disagrees and submits that although the invention disclosed by Yamamoto et al. is directed to a starter switch for a fluorescent lamp, however Yamamoto et al. disclose (abstract) a non-linear capacitor (3) (analogous to

applicant's storage device) and shows in Fig. 2A the saturation characteristics of the non-linear capacitor on a voltage-charge plane whose saturation characteristics help understand the charging/discharging of the storage device disclosed by Yoon (see rejection of claim 1 above).

Applicant also argues that in reference to claims 7-13, Gartstein et al. does not disclose, teach or suggest determining characteristics parameters and they do not disclose, teach or suggest an instantaneous damage rate sensor, or real time damage estimates.

Examiner respectfully disagrees and submits that Gartstein discloses (abstract; col. 13, lines 14-28; col. 14, lines 4-11;col. 26, lines 1-8; col. 33, lines 40+) that the embedded controller (140) comprising of the discharge sub-controller circuit (102), and/or the charge sub-controller circuit (104) based upon continuously or intermittently (real time) sensed operating parameters (characteristics parameters) and/or physical conditions (applicant's plurality of modeled dynamic states) of the electric storage device.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M'baye Diao whose telephone number is 571-272-9748. The examiner can normally be reached on M-Th from 8:00 am to 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom, can be reached on (571) 272-9819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M'baye Diao
Examiner
Art Unit 2838

M.D

KARL EASTHOM
SUPERVISORY PATENT EXAMINER